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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,246	02/09/2004	Peter S. Carlson	029013-0108	7166
22428	7590	08/24/2004	EXAMINER	
FOLEY AND LARDNER SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			MCKANE, ELIZABETH L	
			ART UNIT	PAPER NUMBER
			1744	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/773,246

Applicant(s)-

CARLSON, PETER S.

Examiner

Leigh McKane

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 072904.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6, 7, 11-15, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Lavanish et al (U.S. Patent No. 4,857,099).

Lavanish et al teaches adding a herbicide to aquatic algae in a growth regulating or herbicidal amount. The herbicides may be applied in known forms and methods such as in liquid, powder, and solid form. They may be applied by spraying or in pellet form. See col.8, line 3 to col.9, line 12. As aquatic algae are inherently a sink for carbon dioxide, applying an herbicide to the algae will cause it to sink and sequester the carbon dioxide contained therein.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1, 7-10, 16-18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al (U.S. Patent No. 5,992,089) in view of Metzger et al (Abstract of "Sequestering of atmospheric carbon through permanent disposal of crop residue").

Jones et al teaches a method of sequestering carbon using an aquatic biomass growing with 50 meters of the ocean surface wherein the biomass is fertilized with ammonia in order to increase the amount of carbon that is sequestered by the biomass. Jones et al further discloses that as the phytoplankton dies, it sinks to deeper ocean layers carrying with it the sequestered carbon. See col.4, lines 27-37. Jones et al does not teach a separate step of removing the aquatic biomass.

Metzger et al discloses that it was known in the art at the time of the invention to sequester carbon dioxide through permanent disposal of crop residues (corn, soybeans, wheat) in deep oceans or river deltas.

It would have been obvious to one of ordinary skill in the art to remove the aquatic biomass of Jones et al by intentionally disposing of it in the deep ocean, as taught by Metzger et al, specifically since Jones et al recognizes that the natural sinking of dead biomass achieves the same objective only on a smaller/slower scale.

6. Claims 2-4, 6, and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al and Metzger et al as applied to claim 2 above, and further in view of Lavanish et al (U.S. Patent No. 4,857,099).

The combination of Jones et al with Metzger et al teaches intentional removal of an

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aquatic biomass by disposing of the biomass in the deep ocean or river delta, but does not disclose applying a chemical which destroys, kills, or sinks the biomass.

Lavanish et al discloses known aquatic herbicides that controls the growth or kills aquatic plants. See Abstract and col.8, lines 3-5. The herbicides may be applied in known forms and methods such as in liquid, powder, and solid form (col.8, lines 25 to col.9, line 12). They may be applied by spraying or in pellet form.

One would have found it obvious to employ an aquatic herbicide/growth regulator to increase the rate at which the aquatic biomass of Jones et al sinks to the deep ocean in order to achieve the carbon sequestration/disposal objectives of the combination.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al, Metzger et al, and Lavanish et al as applied to claim 4 above, and further in view of Malik (U.S. Patent No. 6,083,874).

The combination *supra* fails to teach that the herbicide is endothall. Malik discloses that endothall is a known phytotoxicant used to kill chlorophyll-containing aquatic plants (col.2, lines 35-38). Therefore, it would have been obvious to one in the art to substitute another herbicide for that taught by Lavanish et al, as the results would not have been unexpected.

8. Claims 19, 20, 22-26, 28-29, 31-33, 35, 36, 3-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al in view of Metzger et al and Lavanish et al.

Jones et al teaches a method of sequestering carbon using an aquatic biomass growing with 50 meters of the ocean surface wherein the biomass is fertilized with ammonia in order to increase the amount of carbon that is sequestered by the biomass. Jones et al further discloses that as the phytoplankton dies, it sinks to deeper ocean layers carrying with it the sequestered

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carbon. See col.4, lines 27-37. Jones et al does not teach a separate step of removing the aquatic biomass by adding an herbicide.

Metzger et al discloses that it was known in the art at the time of the invention to sequester carbon dioxide through permanent disposal of crop residues (corn, soybeans, wheat) in deep oceans or river deltas.

Lavanish et al discloses known aquatic herbicides that controls the growth or kills aquatic plants. See Abstract and col.8, lines 3-5. The herbicides may be applied in known forms and methods such as in liquid, powder, and solid form (col.8, lines 25 to col.9, line 12). They may be applied by spraying or in pellet form. Additionally, the herbicides may be applied aerially (col.7, lines 6-11).

It would have been obvious to one of ordinary skill in the art to remove the aquatic biomass of Jones et al by intentionally disposing of it in the deep ocean, as taught by Metzger et al, specifically since Jones et al recognizes that the natural sinking of dead biomass achieves the same objective only on a smaller/slower scale.

Furthermore, one would have found it obvious to employ an aquatic herbicide/growth regulator to increase the rate at which the aquatic biomass of Jones et al sinks to the deep ocean in order to achieve the carbon sequestration/disposal objectives of the combination.

It is further deemed obvious to repeat the application of herbicide any number of times necessary to sequester the desired amount of carbon dioxide.

9. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al, Metzger et al, and Lavanish et al as applied to claim 33 above, and further in view of Malik.

The combination *supra* fails to teach that the herbicide is endothall. Malik discloses that

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endothall is a known phytotoxicant used to kill chlorophyll-containing aquatic plants (col.2, lines 35-38). Therefore, it would have been obvious to one in the art to substitute another herbicide for that taught by Lavanish et al, as the results would not have been unexpected.

10. Claims 27 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Markels, Jr. (U.S. Patent No. 6,056,919) in view of Metzger et al and Lavanish et al.

Markels, Jr. teaches a method of sequestering carbon dioxide in the deep oceans wherein the amount of carbon dioxide that is sequestered is measured and the resulting measurement can be used to apply for a carbon credit. See col.2, lines 22-56. The carbon is sequestered in algae and phytoplankton which sink to the bottom of the ocean. See col.4, lines 23-52. Markels, Jr. does not disclose applying an aquatic herbicide to the algae or photoplankton.

Metzger et al discloses that it was known in the art at the time of the invention to sequester carbon dioxide through permanent disposal of crop residues (corn, soybeans, wheat) in deep oceans or river deltas. Lavanish et al discloses known aquatic herbicides that controls the growth or kills aquatic plants. See Abstract and col.8, lines 3-5.

It would have been obvious to one of ordinary skill in the art to remove the aquatic biomass of Markels, Jr. by intentionally disposing of it in the deep ocean, as taught by Metzger et al, specifically since Markels, Jr. recognizes that the natural sinking of dead biomass achieves the same objective only on a smaller/slower scale. Furthermore, one would have found it obvious to employ an aquatic herbicide/growth regulator to increase the rate at which the aquatic biomass of Jones et al sinks to the deep ocean in order to achieve the carbon sequestration/disposal objectives of the combination.

Moreover, it would have been obvious to apply the herbicide to only select portions in order to prevent complete removal of a major food source of ocean fish (col.5, lines 11-15).

11. Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geiger et al (U.S. Patent No. 3,634,061).

Geiger et al teaches a method of controlling aquatic plant growth in an artificial reservoir wherein an herbicidally effective amount of a compound is added to kill the aquatic plants (algae). See col.1, lines 4-15 and col.2, lines 61-62. As aquatic algae are inherently a sink for carbon dioxide, applying an herbicide to the algae will cause it to sink and sequester the carbon dioxide contained therein.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Murray et al (U.S. Patent No. 6,190,301) teaches embedding solid carbon dioxide in the deep ocean floor.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leigh McKane whose telephone number is 571-272-1275. The examiner can normally be reached on Monday-Wednesday (7:15 am-4:45 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Warden can be reached on 571-272-1275. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leigh McKane
Primary Examiner
Art Unit 1744

elm
23 August 2004